

Feedback through Face/Emotion Detection

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Abstract

Currently, every sector of service needs to get feedback which is information about the quality of service it provides. Feedback is very important to address a specific problem which is seen by customers and to create a good and healthy relationship between customers and service providers. So this paper will show one of the most effective ways of getting feedback through face/emotion detection. Applying this to schools or any organizations that provide service to customers will increase efficiency. It will help teachers to get true feedback from students while learning without any extra time for feedback. The system works with deep learning (neural networks) and it contains a set of procedures like face detection, feature extraction, emotion classification, and finally acting on the collected data.

Keywords- Face detection, Feedback, Emotion, neural networks, deep learning

1. Introduction

Feedback is statistics accrued from customers or users indicating the overall performance of someone or something. Feedback can help us to know the perspective of the user or audience. It is seen that collecting feedback from students can help teachers improve the overall learning and teaching process. But most of the time college students don't provide their authentic comments both for being lazy or to keep away from a war of words from their teacher. Especially in on-line training and webinars instructors and presenters aren't capable of getting the appropriate comments which would possibly result in incorrect conclusions. But in head to head verbal exchange human beings have a tendency to suggest their feelings by means of facial expression. So if teachers manage to observe the facial expression of students, they will know the exact feedback they need. Facial detection is a mechanism used for detecting people's faces from images or pictures. It is widely used in biometric authentication. We can find it in our smartphones. Human emotions are vital functions in human interaction. It is likewise similarly vital to apprehend and classify emotions the use of computers, which drives this studies to discover in numerous actual international domains. Feelings maintain to play a crucial

position in how a person is aware and learns approximately mind in general. The emotion state may be a superb emotion which includes joy. On the other hand, teachers who can capture the disgust of their university college students can adapt the direction after thinking of reasons for University College students' emotional states, and therefore promote their learning. Feedback is an essential for any activity. Not simply giving comments, however additionally receiving it's far crucial for effectively sharing records inside groups. It clearly influences communication, organization members' interaction and teamwork outcomes in awesome fields. In our paper we can advise a mechanism of attaining feedback through the usage of facial recognition. It is obvious people will express their emotions through facial expressions and these expressions are very useful as a form of feedback. Any emotions like happy, angry, sad, neutral, fear, disgust so many more will be useful for one company or for a person who wants to have feedback. So we can gather these emotions through facial recognition, facial recognition will detect a person and then it will detect the emotion of the person then it will tell us the genuine expression or genuine feedback which we wanted to get.

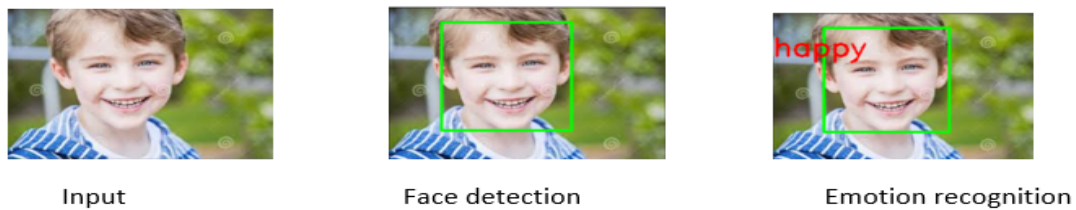


Fig 1 face detection and emotion recognition

2. Review literature

There are difficulties in getting genuine feedback from customers. Traditional tools such as polls were considered to have failed in assessing the people's actual emotions. Emotion detection algorithms can be used to eliminate these misunderstandings and evaluate the viewer's overall opinion. (M.Kanipriya, 2020). Multi camera based emotion detection systems can be applied in schools which will capture and record students facial expressions like positive feedback, negative feedback or confusion and it will report it to the teachers. While comparing results of this system it has been noticed that the system can give a true reflection of the students' feedback. This system contains a set of procedures starting from image acquisition, face detection, face normalization, emotional features extractions and finally emotion classification (Sheng Chen, 2019). We can use various techniques for facial expression recognition like Principal component analysis (PCA) which will be useful for dimension reduction of images and provides effective face indexing and retrieval. Linear discriminant analysis is another technique used for reducing projected sample scattering with better performance than PCA. System must try

to be invariant for different situations and distractions like hair style, eyeglasses and different lighting conditions. Since there is a big variability in the data that is inserted as input, achieving optimal feature extraction and classification is very challenging (Jyoti Khokhar, 2014). Feedbacks can also be used for recommendation systems, the system will detect faces from a live camera, identify gender and product recommendation algorithms for targeting products to the right user then it uses an emotion recognition system for getting feedback about the recommended products. (Leo Pauly, 2015)

3. Materials and methods

The methodology for feedback gathering using a face detection system applies several steps to reach the desired output. These steps applied on the images or live web cam under several models then produce associated emotions within the inputs. The steps are as followed:

1. Face Detection

It is the capacity of a computer system to recognize faces based on the inputs provided. We can use different types of algorithms to recognize a face using a face detection system. Haar feature-based cascade algorithm is used to implement or execute a face detection system. It applies machine learning concepts to recognize faces and objects.

2. Feature extraction

Features play an important role in identifying emotions. There are several techniques used for feature extraction. We can use clustering techniques to identify equivalent features. K-mean is an algorithm that uses clustering techniques.

3. Emotion classification

Among different categories there are a couple of methods that we can implement for categorizing emotion. Firstly we can use a training methodology, in which we train the algorithm using a predefined dataset. The second method is using deepface, which is pre-trained deep learning library. It is a framework in python for face recognition and facial attributes. It is a dataset with different groups of emotions. For example happiness, sadness etc. Different models come under emotion classification that is used to process data and classify the emotions to different data sets. We can use the Convolutional Neural Network model for processing emotion classification stages. CNN can be trained to identify the emotions associated with the provided input data. CNN uses filtering techniques, pooling and normalization. In our proposed system we use a deepface library for emotion recognition.

4. Representing the data using visualization technique

In this stage we represent the output data using a bar graph and pie chart.

5. Acting on the collected data

Using the defined categories, implement changes based on insights from the analysis. This will improve both organization and a customer relationship.

3.1 Proposed System

Flow of Our System is illustrated in Fig. 2.

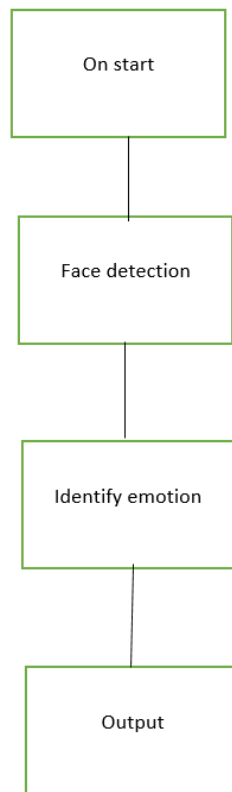


Fig 2 flowchart of the proposed system

Technology and Tools used:

1. Jupyter Notebook
2. python programming language

Libraries used:

1. open-cv
2. Deepface
3. Matplotlib

Steps of Implementation

- Step 1: Face detection from live webcam feed
Step 2: Emotion detection using deepface
Step 3: Representing extracted emotions using matplotlib

4. Result and discussion

While feedback is important in the modern world system, It helps a company to serve customers' needs. To be in that position, the company needs a feedback system. After several studies we came across a proposed system. The results have shown us that

feedback through face recognition is more effective than the traditional feedback system. Our proposed system involves several steps to establish feedback through face recognition. As the results showed us, after performing face detection, emotions are extracted using a predefined dataset. This will give us the emotions associated with the video. This data will be represented using graphical representation. The data that will be extracted from the above steps can be used in analysis of customer's pinpoint, so that it can be proved for further relationship. so from our proposed system we see that feedback is an important system in a customer-client relationship.

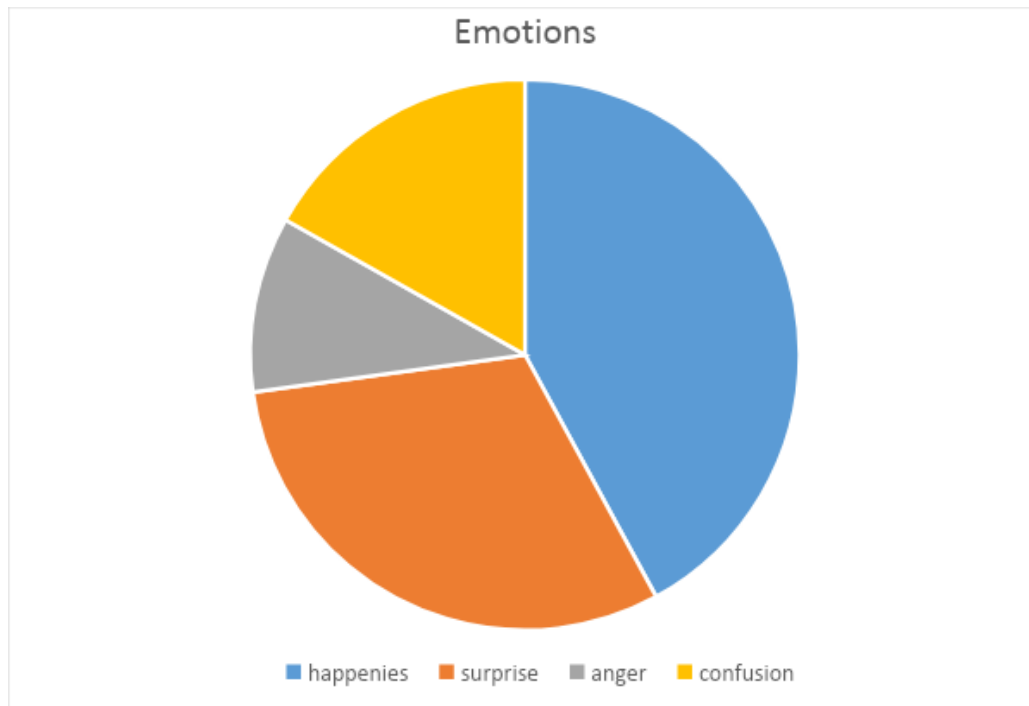


Fig 3 Pie Chart of Emotions

5. Conclusion

The problem of being unable to get relevant feedback to services provided is a major issue any service provider can face. Not getting proper feedback can cost both time and money mainly because we cannot know the strength and weakness of our work. Big companies invest a lot of money on getting genuine feedback and meanwhile they cannot be certain on the quality of the feedback they collect so the implementation of technological assets is needed to help resolve the issue. The idea of feedback through facial recognition is believed to put an end to this problem because there are very few chances people can give false feedback if we can actually get their facial expressions on a live web feed. Moreover this technique helps involve the disabled people by giving feedback if they are able to communicate with sign languages. And it is also efficient in time management because people won't go through long feedback forms. They can give quick feedback in fast interviews. We analysed the collection and capturing of facial expressions and then transformation of these data into the input shape of a model that can be related and compared to a supplied data set to tell the exact emotional expression of the feedback supplier. All in all the involvement of computer systems in the verification of genuine feedback is believed to be more accurate than in person feedback collections because The computer systems are collaborating smart AI technologies and datasets of more than 28000 facial expressions to justify the quality of the feedback collected.

6. Future scope

We can improve our system using advanced algorithms for emotional and face detection. And from a privacy and security angle it has a slight problem which needs to be addressed in the future, because people don't want to reveal their faces. We mean who wants to give his personal things in public and it is peoples right not to be recorded without their permission. So we can use homomorphic encryption for computing the inputs without applying any decryption algorithm to keep the privacy of our customers. By using this method then there is no problem of privacy anymore because no one will decrypt our information, it will be just processed without decryption meaning no one is able to use our personal information.

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